



Exploring Alternative Wastewater Technologies to Meet Small Town Growth Needs

In 2005, the Town of Hinesburg, Vermont faced a dilemma. With new development on the way and a wastewater treatment plant at capacity, Hinesburg realized that the time had come to increase its capacity. As a result, the town asked Yellow Wood Associates, Inc., a small woman-owned consulting firm specializing in natural resource-based rural economic development, to research alternative ways of increasing their wastewater capacity beyond expanding the plant, using their Green Community Technologies process. Hinesburg and Yellow Wood began their work together with the goal of allowing Hinesburg to manage a larger volume of wastewater (from 250,000 to 400,000 gallons per day or GPD) that would meet the discharge requirements of the state. The capacity to manage a larger volume of wastewater is desired to accommodate new development, estimated at an additional 500 residences in the village area (or some combination of commercial, industrial and residential uses).

The Town of Hinesburg, Vermont (population 5,000) is nestled against the edge of the Green Mountains about 15 miles southeast of Burlington and about 10 miles east of Lake Champlain. Chartered in 1762, Hinesburg's history is rooted in farming and early water-powered manufacturing. Today, the village is still surrounded by open green farmland along the small LaPlatte River, a relatively small town among the growing suburbs around Burlington. About 6 miles square, the western half is in the Champlain Valley, the eastern half in the foothills up to 1,700 feet in elevation. The village contains State Highway 116 running north/south. In close proximity to metropolitan Burlington, Hinesburg has seen its share of growth over time, but as growth moves out from Burlington, Hinesburg will see even more.

Alternative technologies offer towns like Hinesburg new choices that may save money over time, help avoid future costs, contribute to local employment, and better protect the environment. However, few alternative technology providers market to rural communities, and few rural communities have the staff, time, or expertise to explore the viability of often rapidly changing technology solutions to their needs. Further, hardly any of the firms that do provide services to rural towns are themselves familiar with alternative approaches. And federal programs promoting alternative technologies are often focused on urban areas, with limited resources to address rural differences in scale, capacity and financial resources.

The Green Community Technologies service offers a systems approach to analyzing municipal infrastructure and determining effective and efficient alternatives. While one solution to increasing capacity for wastewater

treatment involves enlarging the current centralized system to accommodate greater flows, this is not the only option. Other options include reducing the flow of wastewater into the current system through some combination of water conservation for existing and new customers, separation of flows, use of decentralized systems, and/or increasing efficiency of existing systems. The purpose of this process was to explore a variety of possible options and arrive at recommendations for those with the greatest promise for meeting Hinesburg's overall goals of accommodating greater development while minimizing costs and adverse environmental impacts. In addition, Yellow Wood investigated some upgrades to the existing treatment plant, which are needed whether or not the system is expanded.

Yellow Wood began its work by considering all the possible alternatives for each phase of wastewater treatment from collection to primary and secondary treatment to disinfection to discharge. Yellow Wood researched the differences in cost, performance, capacity and impact between the conventional and alternative technologies that could be used to expand Hinesburg's wastewater capacity.

By using a systems approach, Yellow Wood was able to then look at the interactions and synergies between different technologies and pieces of the overall wastewater infrastructure. By looking closely at the Saputo cheese factory (which uses approximately half of the current wastewater capacity), Yellow Wood realized that the wastewater coming out of this factory was often cleaner than any of the other influent and that there was no human waste in it. As a result, this wastewater does not need as much treatment as it's currently getting. Part of Yellow Wood's recommendations to the town included the possibility of separating the cheese factory stream to create additional capacity at the existing treatment plant. This would involve enhancing treatment at the cheese factory. The wastewater from the cheese factory will not go through the entire wastewater facility process, but will instead receive the exact amount of treatment it needs to meet or exceed discharge standards. This work is particularly timely, because the pipe needed to link the treated waste from the cheese plant to a combined outlet for the town is still surrounded by open land, not complicated by the development that will eventually encroach on this land. In this work, timing is everything.

Hinesburg has a number of options to accommodate growth given the current capacity limits at the centralized wastewater facility. The options arrived at by Yellow Wood will avoid the need to enlarge the existing footprint of the wastewater treatment plant. Recommended upgrades to the current plant include upgrading the aeration system, integrating anaerobic treatment into the lagoon system, using constructed wetlands to polish the effluent, and using ultraviolet radiation as an alternative disinfection method to the current use of chlorination/dechlorination. Beyond the above discussion of segregating the cheese plant's wastewater for differential treatment, Yellow Wood came up with some additional recommendations. These include a random inspection program to deal with issues of inflow and infiltration, mandating water conserving appliances for new construction in the village area, and exploring areas for reuse of Saputo's wastewater, for example, on nearby golf courses.

Since municipalities can afford to take a long-term view of their infrastructure investments, a life-cycle costing approach was used wherever possible to compare the total costs of alternative versus conventional approaches. Life-cycle costing is the process of considering alternatives which satisfy all performance requirements (e.g. code, safety, comfort, reliability) based on all costs spent over the life of the longest lived

alternative. These costs include purchase price, operation and maintenance, replacement costs for shorter lived alternatives, and disposal cost.

One systemic change from this work has been an increase in communication between the town and the state. The town has been in discussions with the state about creative, cost effective ways to safely handle the combined discharge of the Town and the cheese plant.

The solutions provided by Yellow Wood for Hinesburg are not generic solutions. The final report and the solutions within it were designed specifically with the town of Hinesburg in mind. Hinesburg has already begun to move forward with some of Yellow Wood's recommendations. The town will look at creating municipal ordinances which will require new construction to consider using energy and water saving appliances and fixtures. The town is currently looking for engineering firms to conduct preliminary engineering work. Town Director of Buildings and Facilities Rocky Martin explains: "What you did was excellent. Some of what you guys thought about we never would have looked into, like mandating water saving fixtures. We never would have come up with these solutions on our own. Your approach to reducing flows was great. Involving Saputo was great. They're such a big part of the scene. In general, I think things went really well. Your final presentation was very well received by the Selectboard. I think they're now going to hold a special meeting on wastewater. It's been well worth it in my opinion."

Through the Green Community Technologies service, Yellow Wood Associates is currently working with eight communities throughout New England, in an effort to assist them in identifying and implementing appropriate alternative options to infrastructure investment that can save money and provide other benefits, such as creating new jobs and promoting environmental protection.

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